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ABSTRACT

The literature on teaching thinking reflects a major controversy which results from two distinctive theoretical views about the nature of thinking. One focuses on content of thinking and the other emphasizes skills involved in thinking. However, an attempt to understand practitioners' perceptions of these theories is generally absent in the literature. The purpose of this study was to investigate teachers' theoretical orientations toward teaching thinking. A survey questionnaire was administered to New York State public school teachers (N=285). Results showed that less than one-fourth of the teachers presented a clear content or skill orientation. The majority of the sample had mixed views about the two theories, indicating that neither orientation was predominant among teachers. Participants presented significant differences in their orientations toward teaching thinking based on subject area and gender. A clear skill orientation was more likely to be found among mathematics, science, and general elementary teachers, while a clear content orientation was most common among English and language arts teachers; almost all social studies teachers presented a mixed orientation toward teaching thinking; female teachers were more likely to be skill oriented than male teachers. (Contains 25 references.) (Author/LL)

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ED 361 305

Teachers' Theoretical Orientations Toward Teaching Thinking

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ABSTRACT

The literature on teaching thinking reflects a major controversy which results from two distinctive theoretical views about the nature of thinking. One focuses on content of thinking and the other emphasizes skills involved in thinking. However, an attempt to understand practitioners' perceptions of these theories is generally absent in the literature. The purpose of this study was to investigate teachers' theoretical orientations toward teaching thinking through a survey questionnaire. The sample included 285 New York State public school teachers, and the results showed that only less than one-fourth of the teachers presented a clear content or skill orientation. The majority had mixed views about these two theories, indicating that neither orientation was predominant among teachers.

Teachers presented significant differences in their orientations toward teaching thinking by subject area and sex. A clear skill orientation was more likely to be found among mathematics, science and general elementary teachers while a clear content orientation was most common among English/language arts teachers. Almost all social studies teachers presented a mixed orientation toward teaching thinking. Female teachers were more likely to be skill oriented than male teachers.

Introduction

Today, improving students' thinking ability is accepted as an important goal of education, and schools are considered places where thinking skills can be promoted. However, how this should be done is a matter of controversy among educators. This controversy basically results from two distinctive theoretical views about the nature of thinking which seem to guide efforts in designing, implementing and assessing thinking skills programs. One focuses on content of thinking, and is based on research on expert-novice studies, and problem solving and reasoning in specific domains of knowledge (Chi, 1978; Glaser, 1984; McPeck, 1992; Prawat, 1991; Swartz, 1987). The other theoretical position emphasizes skills and strategies involved in thinking, and is based on research on specific thinking processes and the organization of these processes in the human mind (Beyer, 1987; De Bono, 1978; 1985; Feuerstein et al., 1980; Sternberg, 1985). These views present contrasting ways of explaining what thinking is, what qualities are associated with it and what causes it, and they suggest different types of activities, roles and responsibilities for schools and teachers in promoting student thinking.

Although there may be wide variation in approaches to definitions of thinking and of various modes of thinking, the general orientations identified above account for the two major views presented in the current literature. However, what remains unclear is how teachers view thinking and how they feel about different approaches to promoting it in the classroom. There is not much information about teachers' conceptions of thinking and their approaches to improving thinking. Do they conceive thinking as content understanding or a set of skills to be learned and practiced? What are their perceptions about interrelationships between knowledge and thinking? Are their conceptions as distinctive as they are in the literature, or do they have mixed conceptions? The purpose of this paper is to present findings of a study designed to answer these questions. The study uses a questionnaire containing content and skill-based statements selected from the literature on teaching thinking, and looks quantitatively at how teachers respond to these statements.

Theoretical Framework

Content Orientation Toward Teaching Thinking

The content-oriented view suggests that it may not be possible to teach someone how to think directly, but it is possible to improve the way someone thinks. This can be done best in terms of knowledge structures and process interactions (Glaser, 1984). Content-oriented view of thinking assumes content and intellectual processes are mutually reinforcing, and interrelationships between knowledge structure and cognitive processes determine the kind of thinking skills to be exercised in the classroom. Thus, teaching should focus primarily on learning a particular content and its complexity. This will help students gradually acquire the process skills as the issues and problems of the content become clear. Understanding a particular discipline in depth, students can understand what cognitive processes they use during learning. In fact, McPeck (1992) argues that one's ability to think effectively is a direct function of one's familiarity with the content under discussion.

Model of cognition emphasized by Neisser (1976; cited in Prawat, 1991) provides a theoretical basis for content orientation toward thinking. In this model, schemata is a key aspect of cognition. Schemata function both as formats for incoming information and as plans for seeking and generating more information about the environment. The second function of schemata is important for content orientation. Ideas function like perceptual schemata and allow individuals to extract new information from the environment while at the same time building upon existing knowledge. Ideas allow individuals to construct meanings when they face new information about the environment, thus making learning a more constructive process. Without ideas or concepts, new information might be complex or abstract. Hence, the issue of how students conceive of the ideas being taught and how these ideas are organized in their minds is essential to content-oriented view. Ideas or concepts serve as most effective intellectual tools for students to pursue knowledge. Prawat (1991) argues that "ideas serves as 'lenses' directing our attention toward important aspects of the environment allowing us to locate and extract information that otherwise would be overlooked" (p. 5).

Evidence for content perspective on thinking also comes from research on experts' and novices' thinking behaviors, and problem solving and reasoning in various disciplines. Chase and Simon (1973), in their investigation of expertise in chess playing, provide evidence that the ability to call upon a rich internal store of information is an important part of competent performance. Expert chess players have tens of thousands of visual patterns stored in their memories. Examination of any one chess position elicits from memory similar configurations along with appropriate move selection strategies. So the fact that the accumulation of large bodies of knowledge accounts for expertise in chess indicates that large and well-developed repertoires of knowledge are advantageous to problem solvers and decision makers.

Since thinking skills are considered as domain-specific, research in this strand has also focused on connections between thinking skills and domains of knowledge, with an assumption that proficiency in thinking ability is a result of rich and well-structured knowledge bases. In a study of children's (ages between 4.5 and 7.2) use of cognitive strategies in sorting and recalling information, Chi (1985) found a strong interdependence between possessions and use of strategies and knowledge about the content. She concluded that:

> ... strategy usage is not a simple matter of whether a given cognitive strategy is or is not available to and usable by the child depending on his stage of maturation. Instead, the use of a given cognitive strategy, it appears, has a complex interaction with the amount and structure of the content knowledge to which the strategy is to be applied. (p. 457)

As a result, Chi's study suggests that children's ability to think and pursue new knowledge is strongly dependent on their prior knowledge of the subject or content under discussion.

In the content-oriented view, thinking skills cannot be taught directly and explicitly as a separate course or a separate instructional unit. Devoting too much attention to explicit teaching of thinking skills and to process of how thinking occurs is considered counter-productive because it may direct attention away from subject matter content. The best way to improve student thinking involves deep and thoughtful subject matter instruction in which students are encouraged to think reflectively rather than merely citing the facts. During this

process, the principles of good thinking are not made explicit. Students learn to use thinking skills as they are deeply immersed in the subject. "An in-depth understanding of content is thought to constitute both a necessary and sufficient condition for the development of higher order thinking" (Prawat, 1991, p. 3). So the issue is how to teach content effectively to allow practice with thinking. In this approach students may not realize that they are engaged in specific thinking strategies. Improved thinking is a by product of dealing with specific content. The full implications of the concepts of the content-based approach calls for fundamental changes in defining curriculum objectives, instructional strategies and assessment.

Skill Orientation Toward Teaching Thinking

The skill view of thinking suggests that thinking is composed of a set of specific skills, such as comparing, ordering, classifying and predicting, which are considered to have wide applicability and generalizability across all subject areas. Thinking skills are considered as learned behavior patterns. The skilled thinker differs from unskilled in their ability to integrate the specific cognitive patterns into a smooth efficient flow. These cognitive patterns are considered as muscles of the mind that can be strengthened through extensive practice (De Bono, 1978; Feuerstein et al., 1980). Skill-oriented researchers agree that knowledge is important, however, for the purpose of the teaching of thinking, they view specific thinking skills as critical because "they are tools that permit knowledge to be used or applied to the solution of new problems" (Newman, 1992, p. 107).

The interest in conceiving thinking ability as a skill or set of skills started in the early 1960s. Newell, Shaw and Simon (1960), in their study of problem solving, argued that thinking might be decomposable into a set of basic information processes that are general and can be applied to all domains. Major developments in the field of artificial intelligence, cognitive psychology and epistemology have made it possible to study mental processing in a more systematic way. These developments were reinforced by studies on general thinking strategies (De Bono, 1978). De Bono, a skill-oriented researcher, argues that intelligence is

simply the speed of processing within the brain, thinking is the operating skills, and knowledge is the basic material handled by thinking. These operating skills are identifiable, and they do not vary from one academic discipline to another. Development of these skills hierarchically on their own develops thinking across all subject areas.

The skill view of thinking is usually translated into application as either a separate course on thinking or separate instructional units in existing subject area courses. These programs have strong connections with theories of intelligence and information processing suggesting that cognitive operations can be taught as the atoms out of which complex thinking is constructed. Intelligence has many components, and the teaching of these fundamental components establishes a basis for many programs. Most programs in this paradigm produce different lists of fundamental operations which can be seen as determinants of intellectual performance. For example, Pogrow's (1988) Higher Order Thinking Skills (HOTS) program lists cognitive operations that are more suitable for students who lack basic cognitive abilities, while De Bono's (1985) Cognitive Research Trust (CoRT) program includes thinking operations, such as representing problem and devising plans, which are more appropriate for students who have already gained basic skills.

The direct teaching of thinking skills involves providing thinking principles in advance and practicing those principles through specific examples. In skill-based programs, thinking skills are practiced specifically and principles of good thinking are made explicit. For example, the teacher posts a chart on a wall or blackboard giving steps in a critical thinking strategy, demonstrates how to apply those principles to specific examples, and asks students to practice with additional examples. Students attempt to develop basic cognitive abilities and general thinking strategies through subject domain free exercises, such as puzzles, graphics, daily problems in school or classroom or life in general, or previously learned knowledge from subject areas. These could provide content with which thinking skills are practiced, but the primary purpose is to teach students how to think effectively. Modeling the procedures and principles involved in executing specific thinking skills,

providing students activities to highlight these components and helping them articulate these components are some of the basic activities in teaching thinking skills (Beyer, 1987; Ennis, 1989). The explicit purpose here can be related to the assumption that these principles lead students to accept various strategies they may use to direct their own thinking (Bail and Abalos, 1989).

Beyer advocates teaching both micro and macro level skills directly and explicitly in regular classrooms as separate instructional units. Students are told what skill they are going to learn; they learn it; they practice it; they master it; then they apply it to the regular subject matter content. On the other hand, Feuerstein et al.. (1980) suggest that thinking skills are best taught separately from subject matter content. According to their argument, separate instruction can particularly be effective for low-achieving students who lack prerequisite subject matter knowledge. The main assumptions in both of these approaches are that thinking skills can be taught directly, without depending on specific knowledge, and that the skills learned in a separate course or unit can help students better understand knowledge in subject matter areas in regular classrooms.

Methods and Data Sources

Teachers' theoretical orientations toward teaching thinking were investigated through a survey questionnaire which included statements based on the two main theoretical positions reflected in the related literature (content- and skill-based). In content-based statements, complex understanding of the content to which thinking is directed, the domain specificity of thinking and the contribution of content structure to thinking were emphasized. With regard to skill orientation the focus was on the generalizability of thinking skills for all subject areas and the importance of practicing thinking skills explicitly. Orientations were presented in the form of item statements for teachers to endorse on a five-point Likert-type scale from "strongly disagree" to "strongly agree."

The questionnaire was validated by four experts in the field of teaching thinking to establish content validity, and tested with 15 elementary, junior high and high school

teachers in New York City. As a result, revisions were made on several questions to provide clarity. Based on responses of the pilot group, reliability of the items measuring theoretical orientations to teaching thinking was assessed by an "internal consistency measure" (Rossi et al.., 1983; Slavin, 1983). For this purpose, two scales were established. The first contained the items measuring content orientation, and the second included the items on skill orientation. Scores for each response were assigned, and Coefficient Alpha scores were calculated for items in both scales. A .76 alpha score for the content orientation scale and a .78 alpha score for the skill orientation scale were obtained.

The population of the study included all public elementary and secondary school teachers in New York State. A total of 600 subjects was randomly chosen by the Bureau of Educational Data Systems of the New York State Department of Education from all schools across the state. The questionnaires were mailed to the sample in mid-September of 1991. In the first round, 246 completed questionnaires were returned. After reminder postcards were sent, 39 more questionnaires were received. As a result, a total of 285 usable questionnaires were returned (47.5% return rate). As Table 1 presents, general elementary teachers formed the largest group of respondents (23%). English/language arts, social studies, mathematics and science teachers were represented by somewhat similar percentages of respondents ranging from 13% to 17%, the largest being science teachers. Close to two-fifths of the respondents (38.3%) taught at elementary schools (grades K-6), while close to one-third (28.4%) taught at middle schools (grades 6-8/7-9) and a little more than one-fifth (21.4%) taught at high schools (grades 9-12/10-12). Teachers who responded to the questionnaire were predominantly female (62%), taught at suburban schools (64%), and were more experienced teachers (69.2% taught for 11 or more years). The majority had at least a master's degree (83.5%) and close to half (44%) attended at least one workshop on teaching thinking.

Table 1

Distribution of Teachers Responding to Survey by Background Variables

		Frequency	Percent
Subject Area	General Elementary	66	23.2
	English/Language Arts	40	14.0
	Social Studies	37	13.0
	Mathematics	41	14.4
	Science	49	17.2
	Other Areas	52	18.2
		N=285	
School Level	Elementary school	109	38.3
	Middle school	81	28.4
	High School	61	21.4
	Other (6-12, 7-12 or K-12)	34	11.9
		N=285	
Sex	Male	109	38.2
	Female	176	61.8
		N=285	
Teaching Experience	1-5	39	13.8
	6-10	46	16.3
	11-15	43	15.2
	16-20	51	18.2
	21 and more	103	36.5
		N=282	
Educational Background	Bachelor's	47	16.5
	Master's	115	40.4
	Master's + 30	116	40.7
	Doctorate	5	1.8
	Other	2	.6
		N=285	
School Type	Urban	68	24.3
	Suburban	180	64.3
	Rural	32	11.4
		N=280	
Attendance at workshops on teaching thinking	Attended	125	44.2
	Did not attend	158	55.8

N's vary somewhat due to missing data.

In order to measure the representativeness of the study sample in the general population in New York State public schools, the distribution of respondents were compared with the figures published in the 1990-91 New York State Public School Professional Personnel Report by subject area, sex, teaching experience and educational background. As

Table 2 shows, the study sample provides an adequate representation of the general population in terms of subject area, sex and teaching experience. However, in terms of educational background, educational level of the sample is somewhat higher than that of the general population.

Table 2

Comparison of Distribution of Teachers in Study Sample With General Population

		Sample %	Population %*
Subject Area	General Elementary	23.2	30.2
	English/Language Arts	14.0	12.5
	Social Studies	13.0	10.8
	Mathematics	14.4	12.3
	Science	17.2	12.5
	Other	18.2	21.7
Sex	Male	38.2	31.7
	Female	61.8	68.3
Teaching Experience	15 years or less	54.7	50.0
	16 years or more	45.3	50.0
Educational Background	Bachelor's	16.5	31.3
	Master's	40.4	38.9
	Master's+30	40.7	28.8
	Doctorate	1.8	1.0

* Percentages were taken from 1990-91 Public School Professional Personnel Report, New York State Education Department.

The data collected through questionnaires were analyzed using descriptive and inferential statistics. First, frequency distributions for all items that were concerned with orientations toward teaching thinking were tabulated. Then, summed subscale scores were computed for these items for all respondents to see how they responded to the alternative orientations. The content orientation subscale included content-based items, and the skill orientation subscale consisted of skill-based items. Since each subscale includes 10 items, the total subscale score for each respondent was divided by 10 to make it conform to the original Likert scale used in the study (1=strongly disagree; 2=disagree; 3=undecided; 4=agree; 5=strongly agree) and make interpretation easier. Based on these total subscale

scores, the mean and standard deviation scores for both orientations were calculated. Then teachers' content and skill subscale mean scores were divided into high and low values using 3.0 as a break point. As a result, teachers scoring above half of the highest possible scores in both subscales were identified as having a mixed orientation toward teaching thinking; teachers scoring above half of the highest possible score in content-based subscale and below half of the highest possible score in skill-based subscale were grouped as clearly content-oriented; teachers scoring above half of the highest possible score in skill-based subscale and below half of the highest possible score in content-based subscale were identified as clearly skill-oriented; and lastly teachers scoring below half of the highest possible scores in both subscales were grouped as having neither a content nor a skill orientation toward teaching thinking. Cross-tabulations and chi-square tests were used to determine if teachers in these groups presented any significant differences in terms of their subject area, grade level, sex, experience in teaching, educational background and the location of school.

Results and Discussion

Content-oriented researchers argue that effective thinking is strongly influenced by content understanding to which thinking is directed (Chi, 1985; Glaser, 1984; McPeck, 1992; Prawat, 1991). Six statements underlying the contribution of knowledge to effective thinking were included in the questionnaire. As Table 3 displays, the majority of the respondents agree/strongly agree with most of the statements: "Students often think effectively when they have a thorough understanding of the issue or problem to which their thinking is directed" (85%); "Effective thinking is strongly influenced by the amount of knowledge one possesses" (70%); "Students' level of proficiency in a specific thinking skill will vary depending upon the level of knowledge they possess regarding the problem or task at hand" (75%); and "In-depth understanding of content constitutes a necessary condition for the development of higher order thinking" (64%). Respondents are in less agreement with the last two statements in the table. While more than half (57%) agree/strongly agree that many thinking skills will naturally emerge as a consequence of substantial acquisition and processing of knowledge, close to one-third

(29%) disagree/strongly disagree with the statement. Respondents are almost equally divided in their responses to the last statement in the table "The difficulty in effective thinking for most students stems primarily from an inadequate knowledge base" (42% agreeing/strongly agreeing and 43% disagreeing/strongly disagreeing)

These results show that teachers acknowledge the importance of knowledge in effective thinking. However, they seem split in terms of having faith that thinking will emerge on its own or that lack of knowledge is the primary problem with their thinking.

Table 3

Degree to Which Teachers Agree With Statements About the Role of Content Knowledge on Effective Thinking

STATEMENTS	SD	D	U	A	SA	MEAN	N
Students often think effectively when they have a thorough understanding of the issue or problem to which their thinking is directed.	4	8.1	6.2	61.4	23.9	4.00	285
Effective thinking is strongly influenced by the amount of knowledge one possesses.	1.8	21.4	7.3	46.0	23.5	3.68	285
Students' level of proficiency in a specific thinking skill (e.g., analytical thinking) will vary depending upon the level of knowledge they possess regarding the problem or task at hand.	1.1	13.5	10.3	67.7	7.4	3.67	283
In-depth understanding of content constitutes a necessary condition for the development of higher order thinking.	3.5	19.9	12.4	52.8	11.4	3.50	282
Many thinking skills will naturally emerge as a consequence of substantial acquisition and processing of knowledge.	2.1	27.1	13.8	49.3	7.7	3.34	284
The difficulty in effective thinking for most students stems primarily from an inadequate knowledge base.	2.1	41.0	14.8	33.6	8.5	3.05	283

In this table and the following ones, N's for each item vary due to missing responses, and items in the table are listed in order of means. In addition, SD=Strongly disagree, D=Disagree, U=Undecided, A=Agree, SA=Strongly Agree.

Interrelations between thinking and knowledge is often highlighted in content view of thinking (Chi & Koeske, 1983; Glaser, 1984). The questionnaire contained one statement to measure how teachers see this issue: "Thinking and knowledge are interrelated and strongly

influenced by each other." Most teachers (85%) agree/strongly agree with this statement (Mean=3.82 on a five point scale where 1='strongly disagree' and 5='strongly agree'). This is consistent with teachers' responses to statements on the influence of knowledge on effective thinking process.

Content-oriented researchers suggest that the content from regular subject matter areas provide the teacher with the best medium to improve student thinking (Perkins, 1987). In responding to a statement on this issue, two-thirds of the respondents (66%) agree/strongly agree that "Materials for teaching thinking should be derived from regular subject areas" while 19% are undecided and 15% disagree/strongly disagree with the statement (Mean=3.65). This finding indicates that the majority of the teachers view subject specific content as a significant factor in improving student thinking.

Finally, the generalizability of thinking skills across all subject areas is an issue on which content-and skill-oriented researchers have a clear disagreement. In content view of thinking, thinking skills are considered as specific to subject matter areas. In other words, the structure of specific knowledge determines the thinking processes one goes through (Chi, Glaser & Rees, 1982; Hyde & Bizar, 1989). Two statements provide data on how teachers see this issue (see Table 4). While more than half (57%) agree/strongly agree with the statement "How one thinks about any body of knowledge is conditioned largely by the structure of that knowledge," close to one-third (29%) are uncertain. In response to the second statement, again, more than half (53%) agree/strongly agree that specific thinking skills work differently in different domains of knowledge, while more than one-third (36%) disagree/strongly disagree with this statement. So teachers are divided on the issue of the specificity of thinking skills as are the researchers in this area.

Table 4

Degree to Which Teachers Agree With Statements on Specificity of Thinking Skills

STATEMENTS	SD	D	U	A	SA	MEAN	N
How one thinks about any body of knowledge is conditioned largely by the structure of that knowledge.	1.1	12.5	29.2	52.7	4.6	3.47	281
Specific thinking skills work differently in different domains of knowledge.	4.6	31.6	10.6	44.7	8.5	3.21	282

As a result, the majority of the teachers endorse some of the content-based statements clearly while they are divided on others. They recognize the significant role of knowledge in effective thinking and agree that thinking and knowledge are interrelated and are influenced by each other. They agree that thinking skills can best be improved through using materials from regular subject areas. However, overall, teachers are undecided on the issue of whether possession of substantial amount of knowledge is sufficient for improving thinking skills. They also appear uncertain about whether thinking skills are specific to individual subject domains, such as social studies, mathematics.

With respect to skill-based orientation toward teaching thinking, ten statements were included in the questionnaire. Skill view of thinking suggests that the teacher should teach students specific thinking skills explicitly and systematically to make them efficient users of these skills (Beyer, 1987; De Bono, 1978; Pogrow, 1988). A large majority of respondents agree/strongly agree with all the statements reflecting this point of view (see Table 5): "Students can greatly benefit from direct instruction in thinking" (86%); "Specific exercises should be designed to teach thinking skills directly and explicitly" (84%); "The difficulty that many students have in thinking stems from lack of training in specific thinking strategies" (84%); "When students are expected to learn a new thinking skill, the skill should be introduced as explicitly as possible" (80%); "Effective thinking strongly depends on a large repertoire of specific thinking strategies" (77%). These results indicate that teachers value direct and explicit teaching of thinking skills because they think it can be effective. In fact, they attribute students' problem with effective thinking to lack of training in specific thinking skills.

Table 5

Degree to Which Teachers Agree With Statements on Importance of Training Students in Specific Thinking Skills

STATEMENTS	SD	D	U	A	SA	MEAN	N
Students can greatly benefit from direct instruction in thinking skills.	.4	5.6	8.1	59.6	26.3	4.06	285
Specific exercises should be designed to teach thinking skills directly and explicitly.	.7	5.3	9.8	57.9	26.3	4.04	285
The difficulty that many students have in thinking stems from lack of training in specific thinking strategies.	1.4	6.3	8.2	57.5	26.7	4.02	285
When students are expected to learn a new thinking skill, the skill should be introduced as explicitly as possible.	.7	7.7	11.6	51.9	28.1	3.99	285
Effective thinking strongly depends on a large repertoire of specific thinking strategies.	1.1	8.9	12.8	59.8	17.4	3.84	281

Skill-oriented researchers also argue that thinking skills should be taught without an interference from regular subject matter content. In other words, a separate time period should be allocated for practicing thinking skills with little or no attention to the specific content (Beyer, 1987; De Bono, 1985). As Table 6 indicates, teachers' responses to the two statements on this issue are not as enthusiastic as they are to statements in Table 5. Only half of the respondents (50% agreeing/strongly agreeing) think that it is more effective to teach specific thinking skills first and then to show students how the skills are used to achieve specific subject matter goals while more than one-fourth (27%) disagree/strongly disagree with this statement, and close to one-fourth (23%) are undecided. Teachers are even less supportive of the second statement "Providing instruction in how to execute thinking skills with a minimum interference from subject matter is useful in improving thinking." Only 36% agree/strongly agree with this statement while 34% disagree/strongly disagree, and 28% are undecided. These results suggest that teachers are undecided on the issue of the effectiveness of teaching thinking skills in isolation from regular subject matter areas.

Table 6

Degree to Which Teachers Agree With Statements on Teaching Thinking Skills Without Using Specific Subject Matter Content

STATEMENTS	SD	D	U	A	SA	MEAN	N
It is more effective to teach specific thinking skills first and then to show students how the skills are used to achieve specific subject matter goals.	3.2	24.2	23.1	39.3	10.2	3.29	285
Providing instruction in how to execute thinking skills with a minimum interference from subject matter is useful in improving thinking.	4.6	29.8	28.4	34.0	3.2	3.01	285

The literature on skill orientation toward teaching thinking also indicates that thinking is composed of a set of specific skills which are considered to be learned behavior patterns (Beyer, 1987; Feuerstein et al., 1980). Therefore, in skill view, explicit attention to specific steps in thinking skills is required. Two statements reflecting this view are included in the questionnaire (see Table 7). Although the majority of the teachers (68%) agree/strongly agree with the first statement "Students need to be able to identify the mental steps they go through when thinking about an issue or problem in order to become more proficient in thinking," they are divided on the second statement "A good thinker solves any problem in a systematic, step by step manner" (50% agreeing/strongly agreeing and 36% disagreeing/strongly disagreeing). These results may suggest that although teachers believe that it is helpful for students to be aware of their thinking processes, they are not sure if it is always necessary to think in a systematic fashion to be proficient thinkers.

Table 7

Degree to Which Teachers Agree With Statements on Thinking as a Systematic Process

STATEMENTS	SD	D	U	A	SA	MEAN	N
Students need to be able to identify the mental steps they go through when thinking about an issue or problem in order to become more proficient in thinking.	1.8	18.6	11.9	48.4	19.3	3.65	285
A good thinker solves any problem in a systematic, step by step manner.	6.0	31.4	12.8	38.5	11.3	3.18	283

Finally, a statement on the issue of the generalizability of thinking skills across subject areas is included in the questionnaire (Newell, Shaw & Simon, 1960). While 62% agree/strongly agree) that effective problem solving in one knowledge area is a likely indicator of effectiveness in problem solving in other knowledge areas, 27% disagree/strongly disagree (Mean 3.44). The pattern of responses to this statement is somewhat consistent with the responses to the content-based statements on the specificity of thinking skills as discussed in Table 4. So, teachers appear to be divided on this issue.

As a result, teachers overwhelmingly believe that students can benefit from direct and explicit instruction in specific thinking skills, such as problem solving, analogies, analytical thinking. They attribute students' difficulty in thinking to lack of specific training on thinking skills. They endorse the idea of explicit teaching of thinking skills in the classroom, and suggest that students can only think effectively when they have a large repertoire of specific thinking strategies. Although teachers are not certain that a good thinker always solves problems systematically, they find it useful for students to identify mental steps explicitly when solving a problem. However, respondents are uncertain about several aspects of skill orientation. They are divided on the issue of whether thinking skills are generic and they transcend all subject areas. They are also divided on the statement that teaching thinking skills without using the specific subject matter content would be effective.

In order to identify teachers' theoretical orientation toward teaching thinking, content and skill orientation subscale scores were calculated for each respondent. The alpha reliability scores were calculated as .76 for content-based items and as .73 for skill-based items. Although the reliability scores were not very high, they indicated that respondents showed a consistency in their responses to most of the statements within a subscale. The inter-subscale correlation was .43, indicating that teachers are positively oriented toward both positions.

When teachers' content and skill subscale scores were divided into high and low values, four thinking orientation profiles were generated. As Table 8 indicates, three-fourths

of the respondents surveyed have a score of 3.1 or higher on both subscales, indicating a mixed orientation toward content and skill-based approaches to teaching thinking. Of the other respondents, 15% score 3.1 or higher on skill orientation subscale and 3.0 or lower on content orientation subscale, indicating a clear skill orientation while only 7% score 3.1 or higher on content orientation subscale and 3.0 or lower on skill orientation subscale, indicating a clear content orientation. These results suggest that neither content nor skill orientation is predominant among teachers. Rather they are eclectic in their approaches to teaching thinking valuing both content and skill aspects of thinking. They perceive a balance between these two aspects of thinking, see them as related entities in thinking and emphasize them together.

Table 8

Distribution of Four Thinking Orientation Profiles

	CONTENT ORIENTATION SUBSCALE SCORE	
	High (3.1+)	Low (3.0-)
SKILL ORIENTATION SUBSCALE SCORE		
	Mixed orientation	*Skill orientation*
High (3.1+)	75.4% 215	15.1% 43
	Content orientation	*Low orientation*
Low (3.0-)	7.0% 20	2.5% 7

Mean scores are based on a five-point Likert scale where 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

Differences in Thinking Orientation by Background Factors

The data were further analyzed to determine if there was a significant relation between thinking orientation and selected background variables using a chi square test as a measure of significance. The chi-square tests indicate that, only subject area and sex are

significantly related to thinking orientation at the .05 level (Tables 12 and 13). Other background variables (i.e., school level, teaching experience, educational background, school type, and attendance at workshops on teaching thinking) present no significant relationships ($p>.05$).

As Table 9 displays, the majority of teachers in all subject areas have a mixed orientation in their approach to teaching thinking, which is most common among social studies teachers. Content-oriented teachers are the second largest group in English/language arts category while skill oriented teachers are the second largest group in the areas of mathematics, science and general elementary. The table also indicates that general elementary teachers are the least likely to be content-oriented (only 1.5% content-oriented) while social studies teachers are the least likely to be skill-oriented (only 5.4% skill-oriented).

Table 9

Thinking Orientation by Subject Area*

	General Elementary % (N=65)	English/ Language Arts % (N=38)	Social Studies % (N=37)	Mathematics % (N=40)	Science % (N=47)
Mixed orientation	81.5	68.4	89.2	70.0	78.7
Skill orientation	16.9	13.2	5.4	25.0	17.0
Content orientation	1.5	18.4	5.4	5.0	4.3

X^2(df=8, N=227)=18.31, p=.01904

* Low orientation group was eliminated for crosstab analyses and ANOVAs because the number of subjects in this group was too small. Teachers in "other subject areas" category are not included in crosstab analysis.

These findings suggest that a mixed orientation is predominant among teachers in all subject areas. However, mathematics, science and general elementary teachers who do not have a mixed orientation are more likely to be skill-oriented while English/language arts area teachers who do not have a mixed orientation are more likely to be content-oriented in their approach to teaching thinking.

Gender is also significantly correlated with thinking orientation ($p<.05$). As shown in Table 10, a large majority of males have a mixed orientation toward teaching thinking. A mixed orientation is also predominant among females, however, the percentage is much lower than that of males (by 15.3%). In addition, one-fifth of females are clearly skill-oriented. This finding suggests that female teachers are more likely to be skill-oriented in their approach to teaching thinking than their male counterparts.

Table 10

Thinking Orientation by Gender

	Male % (N=108)	Female % (N=170)
Mixed orientation	86.1	71.8
Skill orientation	8.3	20.0
Content orientation	5.6	8.2

X^2(df=2, N=278)=8.23, p=.01634

Conclusions and Implications

One of the main purposes of this study was to find out whether teachers' approaches to teaching thinking fell into two distinctive categories identified in the related literature: a content approach and a skill approach. The survey results indicate that the majority of teachers who participated in this study do not fall into these categories. Rather, they possess a mixed orientation which involves both content- and skill-based approaches in teaching thinking even though these views are theoretically contradictory. Only a minority of teachers present a clear content or skill orientation. This result suggests that most teachers are eclectic in their approach to teaching thinking. Accepting a content view, they acknowledge that in-depth understanding of topics makes an important contribution to one's thinking. They perceive thinking and knowledge as interrelated, and believe that learning and applying subject matter specific knowledge is an effective way of improving student thinking. At the same time, teachers subscribe to skill aspects of thinking by placing great importance on

training students in specific thinking skills, and on making students aware of the cognitive processes they go through when thinking about an issue. They agree that students' difficulty in thinking is mostly due to lack of explicit experience with thinking skills, and that practice with thinking skills contributes to students' thinking.

Teachers are not as enthusiastic in accepting several aspects of both content and skill-based approaches. With regard to content-based orientation, they are split on the issue whether possession of knowledge alone makes a person a good thinker. At the same time, they are undecided whether practicing with thinking skills in isolation from the regular subject matter areas is an effective way of improving student thinking.

These results present significant implications for practice. Until now, the study of thinking has generally been conducted in separate strands, each relatively isolated from each other (Paul, 1990). In the literature on teaching thinking, one finds many programs based on either content or skill theories of thinking. Since teachers' theoretical orientation toward teaching thinking emphasizes both content and skills, they may feel a contradiction with their judgments when they use these programs. So, it might be necessary for program designers to consider the kinds of theories teachers have on thinking and how suitable their programs to these theories.

Another important implication of this study derives from the possibility that teachers' predominant mixed orientation may not be grounded in a thorough understanding of these theories, but rather it might result from an assumption that both approaches contribute to the development of thinking in students. Since there is no definite research indicating the superiority of content, skill or mixed approach to thinking, teachers should be able to clarify their own view in regard to these theories. In preservice and inservice teacher education, teachers could be given the opportunity to explore both orientations and develop their own conception of thinking. This is particularly important since there have been efforts to promote shared decision making (SDM) in schools to give more voice to teachers in what they teach and how they teach it.

Teachers show significant differences in their orientations toward teaching thinking only by subject area and sex. Keeping in mind that the majority of teachers in all subject areas have a mixed orientation in their approach to teaching thinking, a clear skill orientation is more likely to be found among mathematics, science and general elementary teachers while a clear content orientation is more likely to be found among English/language arts teachers. The results on thinking orientation differences by subject area suggest significant implications for practice in schools. Since a consistency between teachers' beliefs and practices would be desirable, this knowledge may assist curriculum developers in these domains in selecting activities which will be more appropriate to teachers' orientations. If teachers believe in the usefulness of the activities, they might be more likely to be effective in carrying them out. Since mathematics, science and general elementary teachers are more likely subscribe to skill than content view of thinking, curriculum developers may include skill-based activities in these areas. However, since teachers' orientations alone would not be sufficient criteria to design the curriculum, the place of these activities in the curriculum should be evaluated in terms of their effectiveness in the development of thinking in students. In the same way, since a content orientation is more common than skill orientation among English/language arts teachers, an emphasis on content-based activities in the curriculum might be more appealing than skill-based activities for English/language arts teachers.

Again, keeping in mind that both groups predominantly have a mixed orientation, female teachers are more likely to be skill oriented than male teachers. However, the results on sex differences in teachers' theoretical orientations toward teaching thinking may also be due to grade level differences since female teachers are more likely to teach at lower grade levels, and general elementary teachers are more likely to subscribe to skill than content aspects of thinking. Further study with a larger group of subjects is necessary to examine differences in theoretical orientations due to sex and grade level.

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